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The mediating effect of cognitive development on children's worry elaboration

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ABSTRACT

The present study investigated how developmentally determined cognitive mechanisms, holding theoretical links to the worry process, mediate the relationship between Age and Worry Elaboration in children. Sixty-four children aged 3–7 ($M = 5.58$, $SD = 1.28$) were presented with a Conservation of Liquid task assessing their Cognitive Development (specifically Concrete Operational Skills), a false-belief task to measure possession of Belief–Desire Theory of Mind, and a task measuring the ability to acknowledge multiple possibilities. The ability to elaborate on potential negative outcomes was assessed using a Worry Elaboration task. Mediation analysis revealed that all three variables significantly mediated the relationship between Age and Worry Elaboration. A multiple mediation model is presented in which Concrete Operational Skills, Belief–Desire Theory of Mind and Multiple Possibilities understanding mediate the relationship between Age and Worry Elaboration.

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Worrying is common amongst normal adolescents and children (Cartwright-Hatton, 2006). Research investigating the frequency of worries in children showed up to 80% of primary school children aged 8–12 reported worrying sometimes, and these worries generally concerned school, illness, dying and social problems (Henker, Whalen, & O'Neil, 1995; Orton, 1982; Silverman, La Greca, & Wasserstein, 1995). Muris, Meesters, Merckelbach, Sermon, and Zwakhlen (1998) investigated the severity of worries in 193 normal children and discovered that 68.9% worried every now and then. 6.2% of this sample met the criteria for Generalised Anxiety Disorder (GAD). Excessive worry is a cardinal component of GAD and a cognitive variable in other anxiety phenomenon (Muris, Merckelbach, Meesters, & van den Brand, 2002). Despite the knowledge that severe childhood anxiety is detrimental to functioning and may produce long-term negative consequences (Cartwright-Hatton, 2006), comparatively few studies have investigated worry in children (Muris, 2007). Consequently, the mechanisms involved in the worry process are not well recognised in young people (Cartwright-Hatton, 2006). One of the many questions yet to be resolved is which developmentally determined cognitive mechanisms are necessary to enable worry in childhood populations.

The association between worry and psychopathology, especially in terms of anxiety disorders, has been widely evidenced. For example, in a recent Meta-analysis, those with anxiety disorders

reported significantly more problems with worry than non-clinical controls (Olatunji, Wolitzky-Taylor, Sawchuk, & Ciesielski, 2011). Further conclusions were that two characteristics of worry (frequency and severity) are more distinctive in GAD compared to other anxiety disorders. This result is in keeping with the consensus that excessive worry is a defining feature of GAD (American Psychiatric Association (APA), 2000). Worry is also a fundamental attribute of Separation Anxiety Disorder, a disorder diagnosed in infancy (or childhood) characterised by significant worry about separation from and possible harm which may come to figures of attachment, such as parents (APA, 2000; Silverman et al, 1995). Finally, it is worth noting there is evidence for a stronger directional relationship between worry producing anxiety than anxiety producing worry (Gana, Martin, & Canouet, 2001). Many have argued for the role of developmental theory in the assessment and treatment of childhood disorders (Field & Lester, 2010; Masten & Braswell, 1991; Ollendick, Grills & King, 2001; Ollendick & Vasey, 1999; Peterson & Tremblay, 1999). For example, identifying a developmentally typical trend defines what constitutes atypical development which in turn can define psychopathology and help specify target behaviours for intervention (Ollendick et al., 2001; Peterson & Tremblay, 1999). Research into the normative developmental trends of worry in childhood is therefore worthy of exploration.

Worry is defined as an anticipatory cognitive process involving negative thoughts and images associated with possible threatening outcomes and their consequences (Vasey, Crnic, & Carter, 1994). The individual elaborates on the possible negative consequences of an event and inflates the likelihood of such possibilities occurring

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(Vasey & Borkovec, 1992). Despite the negative slant of how worry has been defined, it is important to recognise that worry can also serve positive purposes. Based on the idea of worry as an “an attempt to engage in mental problem-solving on an issue whose outcome is uncertain but contains the possibility of one or more negative outcomes” (Borkovec, Robinson, Pruzinsky, & DePree, 1983, p. 9), worry can be conceived as an effort to problem solve, avoid negative events and to prepare for the worst (Watkins, 2008). Therefore worry may provide an adaptive function of problem solving and future preparation (Silverman et al., 1995).

Based on the above definition of the worry process, it is suggested that the cognitive abilities necessary to worry include the capacity to anticipate threatening future events, and the reasoning skills to elaborate on catastrophic possibilities (Vasey et al., 1994). These constructs are operationalised as understanding multiple possibilities and Belief–Desire Theory of Mind. The capacity to mentally represent and anticipate the future is an essential first step for the worry process (Vasey, 1993; Vasey & Daleiden, 1994). Such representation demands the ability to think about possibilities beyond what we know about reality. In other words, to reflect on what may happen and what could have been. Beck, Robinson, Carroll, and Apperly (2006) described two conditions under which thoughts about possibilities occur. Future Hypothetical thinking in which one speculates about the possible outcome of an event and Counterfactual thinking in which we know the outcome and consider alternatives that may have occurred instead. Beck et al. (2006) examined the ability of children between the ages of 3 and 6 to engage in Counterfactual and Future Hypothetical thoughts. Results indicated this ability was limited in 3 and 4 year olds but by ages 5 and 6 children were able to better distinguish multiple possibilities. Note however the ability, although limited in 3 and 4 year olds, was still present, indicating it is at this age children begin to develop this capability which then undergoes a vast improvement from the age of 5 onwards.

A child's ability to envisage multiple threatening outcomes and elaborate on the possible negative consequences should increase as their ability to reason improves (Vasey, 1993; Vasey et al., 1994). Evidence suggests that young children do anticipate and reason about negative consequences (Muris et al., 2002; Vasey et al., 1994) and it is possible one mechanism enabling young children to anticipate and reason about negative consequences comes from attainment of Belief–Desire Theory of Mind. The representational structure underpinning Theory of Mind (the Theory of Mind Mechanism, TOMM) is believed to become active at around four years old (Baron-Cohen, 1995; Leslie, 2000). With the attainment of Belief–Desire reasoning at age 4 children have mastered the understanding that beliefs and desires govern actions (Ziv & Frye, 2003). This allows the child to appreciate mental states which are unobservable (Leslie, 2000). Confirmation of children's Belief–Desire reasoning derives from performance on tasks assessing their appreciation that people's behaviour can be guided by false-beliefs (Berk, 2006). Understanding false-beliefs marks the attainment of meta-representational ability (Frye & Moore, 1991). It is therefore plausible to assume that as young children acquire Belief–Desire Theory of Mind; this permits the prediction of positive and negative possible outcomes of events and the behaviour of other people. This in turn results in an increasing capability to elaborate on worries a child may possess.

Previous research into the association between cognitive development and worry suggest there is a link between the two. Vasey et al. (1994) report the content and process of worry depends on the child's stage of cognitive development, in particular their level of concrete operational skills. Muris et al. (2002) supported this proposition in their study of children aged 3–14 years. Participants were assessed on the content and presence of their

personal worries as well as their ability to elaborate on potential negative outcomes of worry topics. Piagetian conservation tasks served as a proxy of children's concrete operational skills. Data suggested a mediation model in which ability to elaborate was a mediator between Age/Cognitive Development and the presence of personal worry. This implied that as cognitive development increases, so does the ability to elaborate on potential negative outcomes, subsequently increasing the probability of a personal worry being present. Furthermore, both Age and Cognitive Development provided unique contributions to Worry Elaboration.

The present study aimed to investigate how the cognitive abilities as deemed necessary to worry by Vasey (1993; Vasey et al., 1994) mediate the relationship between Age and Worry Elaboration. Aside from Concrete Operational Skills, previous research has not explored how the ability to anticipate multiple threatening future events and reasoning skills to elaborate on catastrophic possibilities mediate the process of Worry Elaboration in childhood populations. It has been discussed how cognitive development, primarily in the form of Concrete Operational Skills, influences the elaboration of worries in child populations (Muris et al., 2002; Vasey, 1993; Vasey et al., 1994; Vasey & Daleiden, 1994). Understanding of multiple possibilities and increasing reasoning skills are also implicated the processes of worry anticipation and elaboration (Vasey, 1993; Vasey et al., 1994; Vasey & Daleiden, 1994). Therefore Concrete Operational Skills, Multiple Possibilities Understanding (MPU) and Belief–Desire Theory of Mind (BDToM) are all hypothesised to mediate the relationship between Age and Worry Elaboration. This would explain how children under 7 are able, but limited in their ability, to anticipate and elaborate. From age 7, the development of abstract reasoning skills takes over and increases the ability to worry by permitting significantly more elaboration on catastrophic thoughts (Vasey & Daleiden, 1994).

1. Method

1.1. Participants

Out of sixty-eight participants recruited, sixty-four participants (31 boys and 33 girls) between 3 and 7 years of age ($M = 5.58$, $SD = 1.28$) completed the study. This age range was appropriate because children typically pass false-belief tasks around four years old (Frye & Moore, 1991), acquire the capacity to understand multiple possibilities around five to six years (Beck et al., 2006), and understand conservation tasks at around seven (Berk, 2006), thus building a step by step account of the relationship between developmental milestones and the ability to worry. The number of participants in each age group are as follows; 3 years ($N = 8$), 4 years ($N = 2$), 5 years ($N = 17$), 6 years ($N = 19$), and 7 years ($N = 18$). On average the number of males and females in each group were equal. Children were recruited from nurseries and state primary schools in the Wells area of Somerset, England. Based on information from the schools, none of the children included in the study were autistic, had conduct problems or were highly anxious. The majority of children were of White, British Heritage, ranging from low to high socioeconomic statuses. Four participants failed to complete the test battery because they were too tired to continue. All these children were between ages three and four.

1.2. Design

This was a correlational study. The predictor variable was Age; mediating variables were Concrete Operational Skills, false-belief understanding (BDToM) and understanding multiple possibilities (MPU). The outcome variable was Worry Elaboration. On average, the research battery lasted 40 min.

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